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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/876,554	06/07/2001	Izuo Iida	10417-084001 / F51-134741	7779

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EXAMINER

RICHARDS, N DREW

ART UNIT	PAPER NUMBER
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2815

DATE MAILED: 02/04/2003

10

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/876,554

Applicant(s)

IIDA, IZUO

Examiner

N. Drew Richards

Art Unit

2815

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 November 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) 4-10 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 June 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Claims 4-10 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected combination, there being no allowable generic or linking claim. Election was made **without** traverse in Paper No. 8.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
3. Claim 2 recites the limitation "said MOS transistor gate" in lines 8-9. There is insufficient antecedent basis for this limitation in the claim.
4. Claim 2 recites the limitation "the region where the control gate of said non-volatile memory cell transistor is to be formed" in lines 11-12. There is insufficient antecedent basis for this limitation in the claim. The control gate and non-volatile memory cell transistor have antecedent basis, but "the region" where they are to be formed does not have antecedent basis. It is suggested that the claim be amended to read as follows, beginning midway through line 11: except a region where the control gate of said non-volatile memory cell transistor is to be formed and the region where the gate insulating film of said MOS transistor is to be formed. Also, line 18 should read "floating gate of said" instead of "floating gate of the said."

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Komori et al. (U.S. Patent No. 5,656,522).

Komori et al. disclose in figure 4 and on column 5 lines 34-36 and column 8 lines 23-33, a method of manufacturing a semiconductor device having a non-volatile memory cell transistor with a control gate stacked on a floating gate through an oxide film and a MOS transistor on the same semiconductor substrate, the method comprising simultaneously forming the oxide film 8 on the floating gate 7a of the non-volatile memory cell transistor and a gate insulating film 8 of the MOS transistor in a single thermal oxidation step.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komori et al. as applied to claim 1 above, in view of Hsieh et al. (U.S. Patent No. 6,165,845).

Komori et al. teach a method of manufacturing a semiconductor device having a non-volatile memory cell transistor with a control gate stacked on a floating gate through an oxide film and a MOS transistor on the same semiconductor substrate. Specifically, Komori et al. teach forming a silicon layer 7a on the substrate 1 (figure 3, column 8 lines 9-21), removing the silicon layer on a region of the MOS transistor gate where a gate insulating film is to be formed (figure 3, column 8 lines 9-21), and forming the oxide film 8 by thermal oxidation on the region where the floating gate is to be formed, whereby the oxide film on the floating gate of the non-volatile memory cell transistor and the gate insulating film of the MOS transistor are simultaneously formed. Komori et al. do not teach forming an oxidation-resistant film on a region of the substrate except a region where the control gate of the non-volatile memory cell transistor is to be formed and where the gate insulating film of the MOS transistor is to be formed or removing the oxidation resistant film.

Hsieh et al. teach a method of fabricating a poly tip in a split-gate flash EEPROM memory cell. Hsieh et al. teach forming an oxidation resistant film 50 on a region of the substrate except where the control gate of the non-volatile memory cell transistor is to be formed in figure 2c. Hsieh et al. then teach oxidizing the exposed silicon layer and removing the oxidation resistant film in figures 2d and 2e. In combining the two references, it would be obvious to one of ordinary skill in the art at the time of the invention that the oxidation resistant film would not be formed on the region where the gate insulating film of the MOS transistor is to be formed as the process of Komori

et al. teach forming the oxide on the floating gate and the gate insulating film of the MOS transistor in the same oxidation step.

With regard to claim 3, the oxidation resistant film of Hsieh et al. is taught as a silicon nitride film.

Komori et al. and Hsieh et al. are combinable because they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of ordinary skill in the art to form an oxidation resistant film on the substrate except where the control gate is to be formed and where the gate insulating film on the MOS transistor is to be formed. The motivation for doing so is to provide a gate bird's beak to enhance Fowler-Nordheim tunneling for the programming and erasing of the cell. Therefore, it would have been obvious to combine Komori et al. with Hsieh et al. to obtain the invention of claims 2 and 3.


Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Clementi et al. (U.S. Patent No. 5,856,221), Freiburger et al. (U.S. Patent No. 5,104,819), Leu (U.S. Patent No. 6,365,459 B1).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to N. Drew Richards whose telephone number is (703) 306-5946. The examiner can normally be reached on M-F 8:00-5:30; Every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on (703) 308-1690. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



NDR
January 30, 2003



EDDIE LEE
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